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Seven new species of *Cephennium* Müller & Kunze (Coleoptera, Staphylinidae, Scydmaeninae, Cephenniini) from California with a key to native North American species

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Abstract

Seven new species of *Cephennium* from California are described and illustrated - *C. celsifrons*, **sp. n.**, *C. mariposae*, **sp. n.**, *C. grandarboreum*, **sp. n.**, *C. canestroi*, **sp. n.**, *C. gilberti*, **sp. n.**, *C. urbanum*, **sp. n.** and *C. aridum*, **sp. n.** The single known native Nearctic species, *C. anophthalmicum* Brendel, was known only from moist coastal forests around the San Francisco Bay area. The new species greatly expand the distribution of the genus, through central and southern California, occurring in the central Sierra Nevada, south through the coast ranges and Sierra Nevada to the Santa Monica Mountains and desert foothills of the San Bernardino and San Jacinto Mountains. A key to all eight species (the entire native Nearctic fauna) of *Cephennium* occurring in California is provided.

Keywords

Systematics, Staphylinidae, Scydmaeninae, Cephenniini, *Cephennium*, California Floristic Province

Introduction

Members of the tribe Cephenniini (Coleoptera: Staphylinidae: Scydmaeninae) are primarily known to occur in the western Palearctic region, and most of the known spe-

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cies belong to the genus *Cephennium*. Newton and Franz (1998) report 124 species of *Cephennium*, only one of which is known to occur in the Nearctic (O'Keefe 2001). This species, *Cephennium anophthalmicum*, was described by Brendel in 1889 from Alameda County in coastal, central California, and until this time remains the only species of this genus described from the Nearctic region (O'Keefe 2001). A second species of *Cephennium*, *C. gallicum* Ganglbauer, has been reported from maritime northeastern North America, but this represents a recent introduction from Europe (Majka and Klimaszewski 2004).

The California Floristic Province is a biodiversity hotspot, recognized for its unique, diverse, and threatened biota (Myers et al. 2000). The California Beetle Project, begun in 2005, was launched to compile a complete inventory of the region's Coleoptera. This effort has documented over 8000 species, and uncovered numerous new ones, both undetected and undescribed (Caterino 2006; Caterino and Chatzimanolis 2007; Caterino et al. 2008). Through these efforts the inadequacy of current documentation of the region's leaf litter fauna has become ever clearer. Intensive collecting in this microhabitat by members of the CBP has yielded several new species of *Cephennium* since 2004, three of which were discovered in the past two years. Along with the newly collected material, four species were discovered in the collections of the California State Collection of Arthropods (CSCA) and the Field Museum of Natural History (FMNH), whose collectors, Fred Andrews and Art Gilbert (by association, CSCA), and Al Newton and Margaret Thayer (FMNH) are avid litter sifters. Only one of the species from our newly collected material and the material we borrowed from other collections overlap, leaving us with seven new species. These seven new species represent a considerable increase in the known Nearctic fauna of this tribe and genus, and significantly expand its known geographic range.

Materials and methods

Specimens examined for this study are deposited in the following institutions and collections (all collection codens follow Evenhuis (2008) and the curators responsible for borrowed specimens are listed in parentheses):

CASC California Academy of Sciences, San Francisco, CA (David Kavanaugh, Jere Schweikert).
CSCA California State Collection of Arthropods, Sacramento, CA (Chuck Bellamy).
FMNH Field Museum of Natural History, Chicago, IL (Margaret Thayer, Alfred Newton).
LACM Los Angeles County Museum of Natural History, Los Angeles, CA (Brian Brown).
MCZC Museum of Comparative Zoology, Harvard University, Cambridge, MA (Philip Perkins).
SBMN Santa Barbara Museum of Natural History, Santa Barbara, CA.

Label data from the material examined are verbatim and transcribed following Ivie (1985): the end of each line on a label is indicated by a ";" (semicolon); the individual labels are separated by a "/" (backslash).

Specimens were studied with a Leica® MZ9.5 stereomicroscope equipped with a 150w Nikon MKII fiber optic light. SEMs were taken with a Zeiss® EVO 40 XVP Scanning Electron Microscope. Specimen measurements were taken using an eyepiece micrometer in a Leica® MZ9.5 stereomicroscope at 3.2× magnification. Length was measured medially from the base of the pronotum to the apex of the elytra; pronotal and eytral widths were measured at their widest points.

Male genitalia were extracted by first relaxing the specimen in hot water and then the entire specimen was placed in a warm solution of 10% KOH. Once the specimen was cleared, it was removed from the KOH solution and rinsed with distilled water, and then placed in 100% EtOH for dissection. The specimen was placed on its dorsal surface and then the abdomen was "pumped" by compressing the abdomen repeatedly just basad of the medial lobe. This gentle pumping pushed the genitalia out through the apical abdominal opening. After examination, the genitalia were then placed in a vial of glycerin that was placed on the pin under the specimen labels. Males can sometimes be recognized when the outline of the genital capsule can be observed through the translucent cuticle. Otherwise, except in the case of *C. celsifrons,* where there is a distinct sexual dimorphism, the sexes are not usually distinguishable.

Key to Nearctic genera of Scydmaeninae

The most recent key to Nearctic genera of Scydmaenidae (=Scydmaeninae, Grebennikov and Newton 2009) (O'Keefe 2001) must be modified in order to accommodate the new species of *Cephennium* described herein. We also revise this to reflect Jałoszyński's (2007) recent synonymization of *Chelonoidum* Strand with *Cephennodes* Reitter. All other native Nearctic Cephenniini are now assigned to *Cephennodes*. Couplet 4(3) should exclude the presence/absence of eyes because several of our new species possess reduced eyes. The couplet should read:

4(3) Foveae present in basal pronotal angles (Fig. 27.20); procoxae separated by prosternal process (Fig. 10.20) ..... ***Cephennodes*** **(Fig. 27.20)**

– Foveae absent from basal pronotal angles; procoxae not separated by prosternal process (Fig. 11.20) ..... ***Cephennium*** **(Fig. 28.20)**

Morphological characters of significance

There are a few diagnostic characters among the California *Cephennium* species that may aid in identifying species collected in the future, and in determining their status

as described or new. Among the species we examined, characters that were useful in delimiting species included the presence of eyes and number of ommatidia, the shape of the humeral angle of the elytron, the number of scutellar setae, the vestiture and apical shape of the mesosternal keel, and the male genitalia. Within the aedeagus, structures that were morphologically useful to delimit species were the shape of the median dorsal projection and the arrangement of setae arising from the apical collar.

Species descriptions of California *Cephennium* Müller & Kunze

Cephennium anophthalmicum Brendel, 1889

Figs 1A, 2A, 3A, 5A, 6

Type Material. Not seen. A holotype was not designated for this species. However, it was described from a single specimen from Alameda County that was sifted from vegetable debris together with a large number of *Pinodytes cryptophagoides* (currently *Catopocerus cryptophagoides*) by Marie Fuchs (Brendel 1889). We attempted to track down this specimen but were not able to locate it at either the Academy of Natural Sciences in Philadelphia, the original repository of the Brendel collection, or the Museum of Comparative Zoology at Harvard University, the current repository for the Brendel collection. However, we did see a specimen from the MCZC that was determined as *C. anophthalmicum* from Alameda County. Because the label data do not exactly match the information presented by Brendel (1889) we believe this is only a topotype, and not a primary type. We choose not to designate a neotype here as it is possible that the original type specimen is still in existence somewhere.

Material Examined. "Alameda; Co. CAL."/ "Laundry; Farm"/ "H. C. FALL; COLLECTION"/ "*Cephennium*; *anophthalmicum*; Brend." (1 MCZC); "Mill Valley; Marin Co. Cal.; 30.V.1952"/ "By sifting; forest duff"/ "H.B. Leech; Collector"/ red square label/ "*Cephennium*; sp. ♀; Cl. Besuchet; det. V 1961"/ "Collection of the; CALIFORNIA ACADEMY; of SCIENCES, San; Francisco, Calif." (1 CASC); "Loma Mar; SanMateo Co.Calif; IV-29-1970"/ "ex. Redwood; Litter"/ "Collector; T.R.Haig" (1 FMNH [female, disarticulated]).

Diagnosis. This species can be distinguished from its California congeners by the character combination of the absence of eyes, humeral angle of elytron bluntly angulate (Fig. 1A), and the absence of a basal elytral sutural ridge. *Cephennium anophthalmicum* most closely resembles *C. urbanum*, but can be separated from it by the presence of a basal elytral sutural ridge (Fig. 1G), and the apex of the mesosternal keel divergent and crescent-shaped in *C. urbanum* (Fig. 2G). It can be easily distinguished from *C. aridum*, *C. celsifrons*, and *C. mariposae* by the presence of eyes in these species (Fig. 4A, C-D), and can be separated from *C. grandarboreum*, *C. canestroi* and *C. gilberti* by the humeral angle of the elytron, which is raised, dorsally flattened and apically rounded in these three species (Fig. 3D-F).

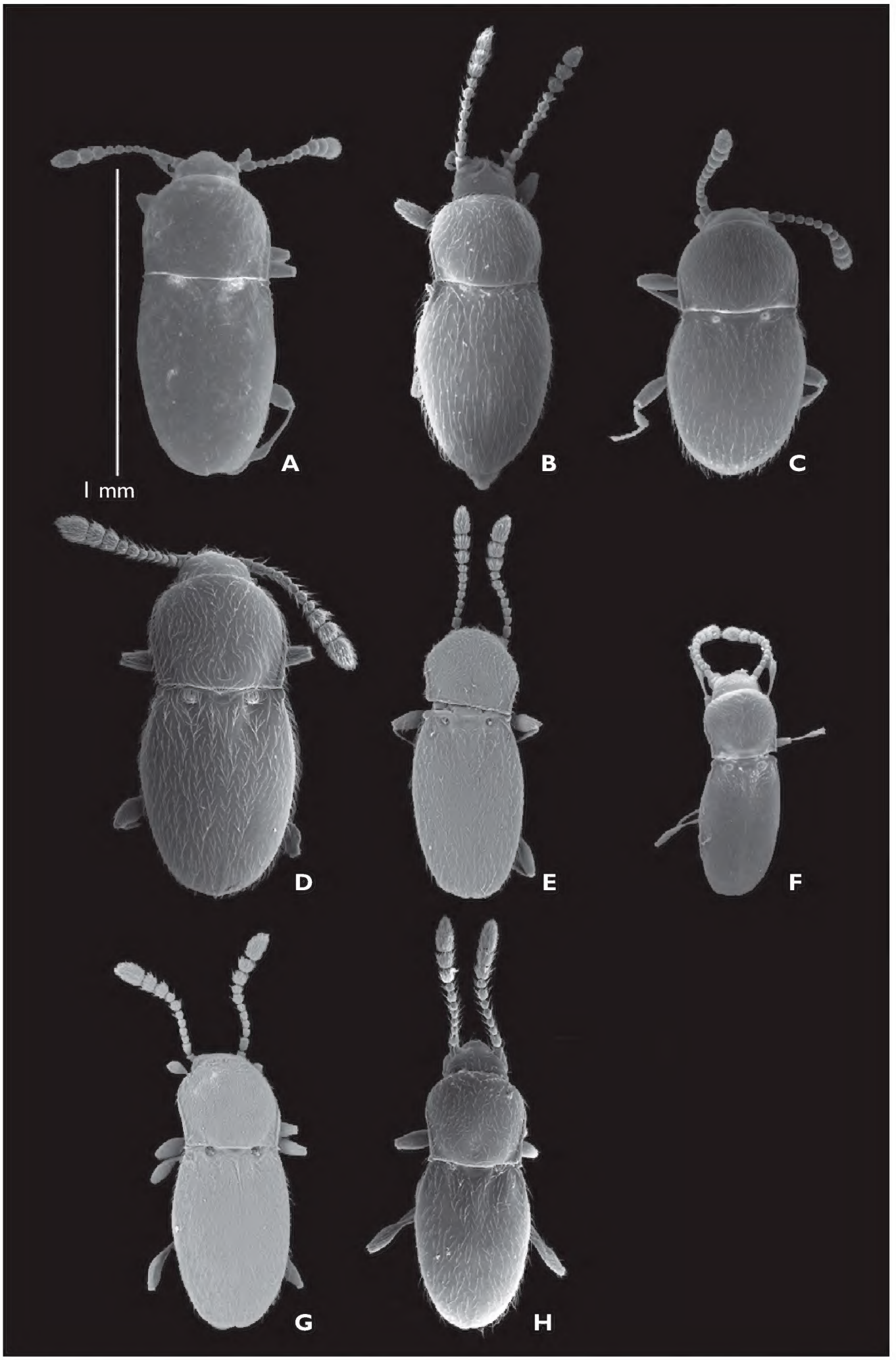

Figure 1. A–H Dorsal habitus SEMs, all to same scale **A** *Cephennium anophthalmicum* Brendel **B** *Cephennium celsifrons* Hopp & Caterino **C** *Cephennium mariposae* Hopp & Caterino **D** *Cephennium grandarboreum* Hopp & Caterino **E** *Cephennium canestroi* Hopp & Caterino **F** *Cephennium gilberti* Hopp & Caterino **G** *Cephennium urbanum* Hopp & Caterino **H** *Cephennium aridum* Hopp & Caterino.

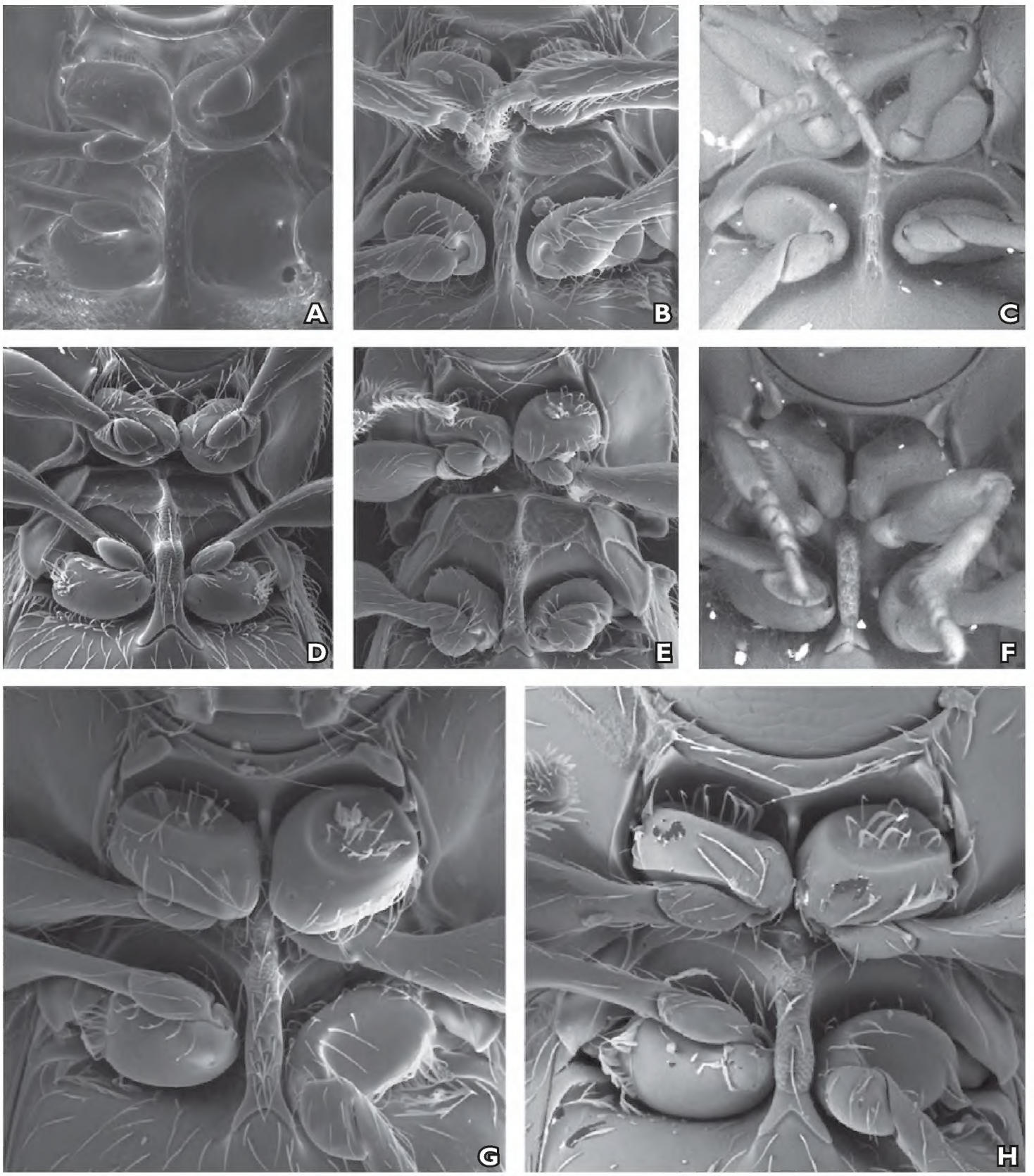

Figure 2. A–H Mesosternal keel SEMs **A** *Cephennium anophthalmicum* Brendel **B** *Cephennium celsifrons* Hopp & Caterino **C** *Cephennium mariposae* Hopp & Caterino **D** *Cephennium grandarboreum* Hopp & Caterino **E** *Cephennium canestroi* Hopp & Caterino **F** *Cephennium gilberti* Hopp & Caterino **G** *Cephennium urbanum* Hopp & Caterino **H** *Cephennium aridum* Hopp & Caterino.

Redescription. Male. Length: 0.874 mm; pronotal width: 0.418 mm; elytral width: 0.475 mm. Body elongate, slender, weakly convex; testaceous; evenly and moderately pubescent; pubescence golden, slender, moderately long, weakly decumbent (Fig. 1A). Dorsal surface of head smooth, weakly pubescent, narrowing anteriorly from antennal insertions. Eyes absent. Antenna setose, antennomere I and II longer than broad, antennomeres III-VI quadrate and smaller than antennomeres II and VII, an-

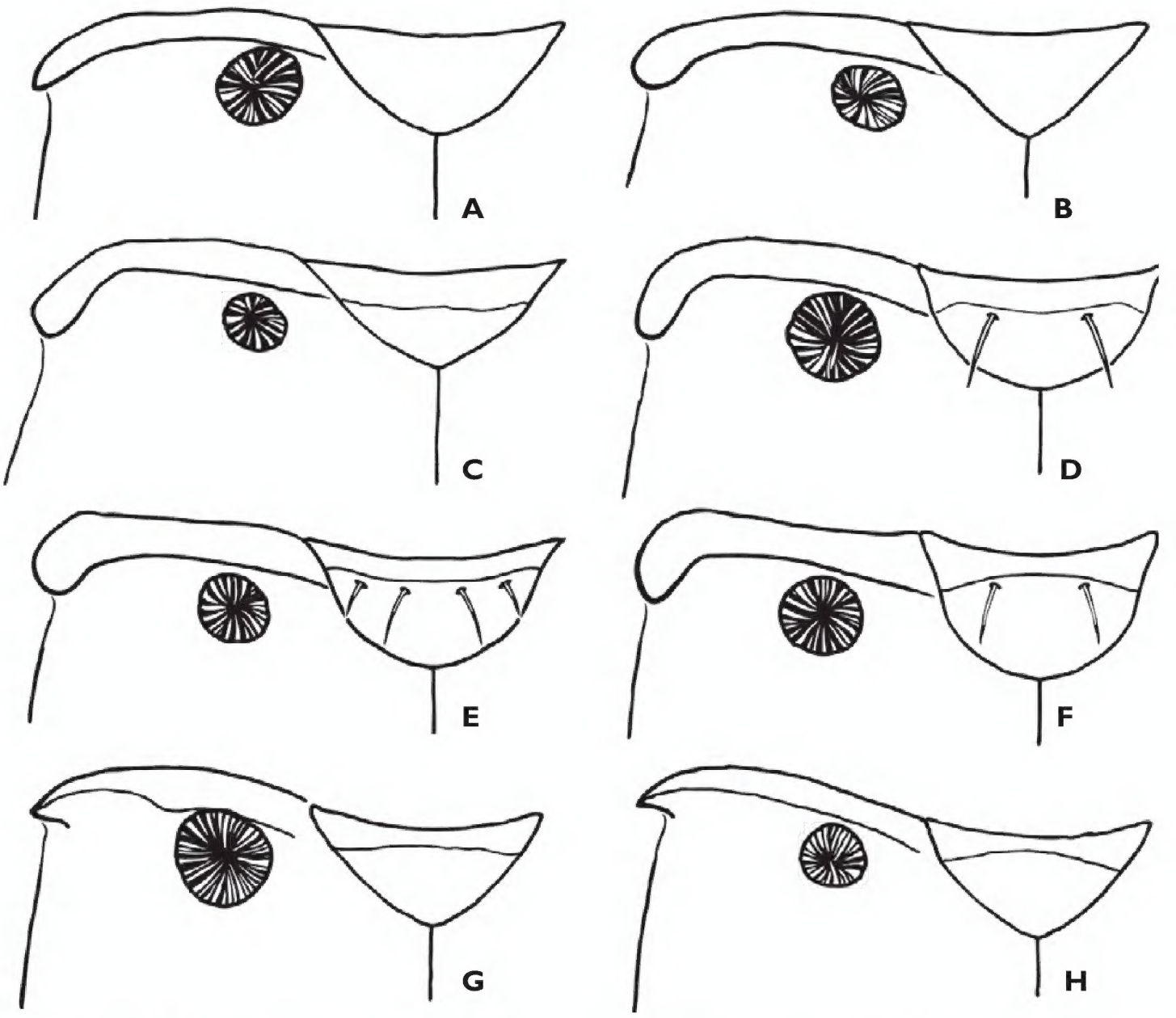

Figure 3. A–H Base of left elytron **A** *Cephennium anophthalmicum* Brendel **B** *Cephennium celsifrons* Hopp & Caterino **C** *Cephennium mariposae* Hopp & Caterino **D** *Cephennium grandarboreum* Hopp & Caterino **E** *Cephennium canestroi* Hopp & Caterino **F** *Cephennium gilberti* Hopp & Caterino **G** *Cephennium urbanum* Hopp & Caterino **H** *Cephennium aridum* Hopp & Caterino.

tennomere VIII smaller than antennomeres VII and IX, antennomeres IX-XI gradually clavate forming a loose club. Pronotum moderately pubescent, broadest between middle and anterior third, very convex in disc and moderately flattened near each posterior angle; anterior margin not visible from above; anterior and posterior margin lacking marginal bead; lateral marginal bead complete, gradually widening towards base; lateral edge broadly rounded to posterior third, then weakly sinuate to base (Fig. 1A). Hypomeron smooth, sparsely setose towards anterior quarter and along outside (lateral) edge. Prosternum lacking protuberant nodules anterolaterad procoxal cavities (Fig. 2A). Elytra smooth, as pubescent as pronotum, covering all abdominal segments; elytral suture flat; basomedial fovea present on each elytron; fovea moderate in size, moderately pubescent (Figs. 1A, 3A). Humeral angle of elytron projecting laterally to blunt point, dorsally raised and flattened (Fig. 3A). Scutellum weakly triangular, lacking setae (Fig. 3A). Mesosternal keel sparsely setose, lacking scale-like microsculp-

ture, posterior quarter impunctate, apex weakly bifid (divergent), divergent projections short, triangulate (Fig. 2A). Metathoracic wings vestigial. Femora strongly clavate in distal half, tibiae expanded and becoming more densely setose towards distal half. Five visible abdominal sternites, ventrites V and VI partially fused. Aedeagus strongly sclerotized, with median lobe basally rounded, pill-shaped; parameres thin, sinuate, bisetose apically, extending to apex of rather narrow, bluntly triangular median dorsal process; apical digiform process curving ventrad at apex, extending just beyond apical collar; membranous apical collar with sclerotized clasper-like processes extending from apex; membranous lateral flaps present at base of apical collar (Fig. 5A).

Female. Identical to male.

Biology. This species was first described from a single specimen that was sifted from vegetable debris. An additional specimen was sifted from forest duff. Beyond this, there is little known about the biology of this species.

Distribution. This species has been collected around the San Francisco Bay Area in central coastal California (Fig. 6).

Cepehennium celsifrons Hopp & Caterino, sp. n.

urn:lsid:zoobank.org:act:FB4E5DDF-D621-4B8E-A233-E2956D8C66EB
Figs 1B, 2B, 3B, 4A-B, 5B, 6

Type Material. Holotype. Male. "CALIF: Calaveras Co.; 3.0 mi NW West Point [~38.4160°N, 120.5515°W]; 2250 ft., v.20.1976; berl.; litter, mixed hdwd.- *Pinus* -; *Libocedrus – Abies*; for.; A. Newton, M. Thayer"/ "*Cephennium* sp. ♀; A. Newton det. 1978" (FMNH).

Paratypes (8): 1 specimen with same data as holotype (SBMN [gold coated for SEM]); "CALIF: Calaveras; Co., 3mi NW West; Point 2250'; v.20.1976"/ "A. Newton; M. Thayer; collectors"/ "A. Newton; M. Thayer; collectors" (1 MCZC); "CAL.: Calaveras Co.; 3 mi NE Glencoe 2000'; VI.25.1975 berl. litter,; oak – conifer forest away; from stream; A. Newton"/ "*Cephennium*; A. Newton det. 1975" (2 FMNH, females); "3 miW Michigan Bar; Amador Co., Cal.; III-3-1971"/ "ex Berlese-; oak duff"/ "Fred G.; Andrews; collector" (1 FMNH, male [disarticulated]); "CALIF: Amador Co.; Pine Grove; IV-15-1972; Fred G Andrews"/ "Berlesed; Oak; Litter" (1 CSCA); "CALIF: Amador Co.; 1 mi. W Pine Grove; II-14-1971; R. F. Wilkey; Ex. Rotten wood" (1 CSCA); "Pine Grove; Amador Co., Cal.; IV.15.1972"/ "Berlesed; from; Oak duff" (1 CSCA [disarticulated]).

Etymology. This species name is derived from the latin *celsus* (elevated or lofty) in combination with *frons*, in reference to the unique, prominent sexual dimorphism exhibited by the male.

Diagnosis. This species can be distinguished from all California congeners by the character combination of the presence of two ommatidia on each side of the head (Fig. 4A), the mesosternal process truncate at the apex (Fig. 2B), and the frons of the male with a median longitudinal ridge (Fig. 4B). The male frons structure is unique to this

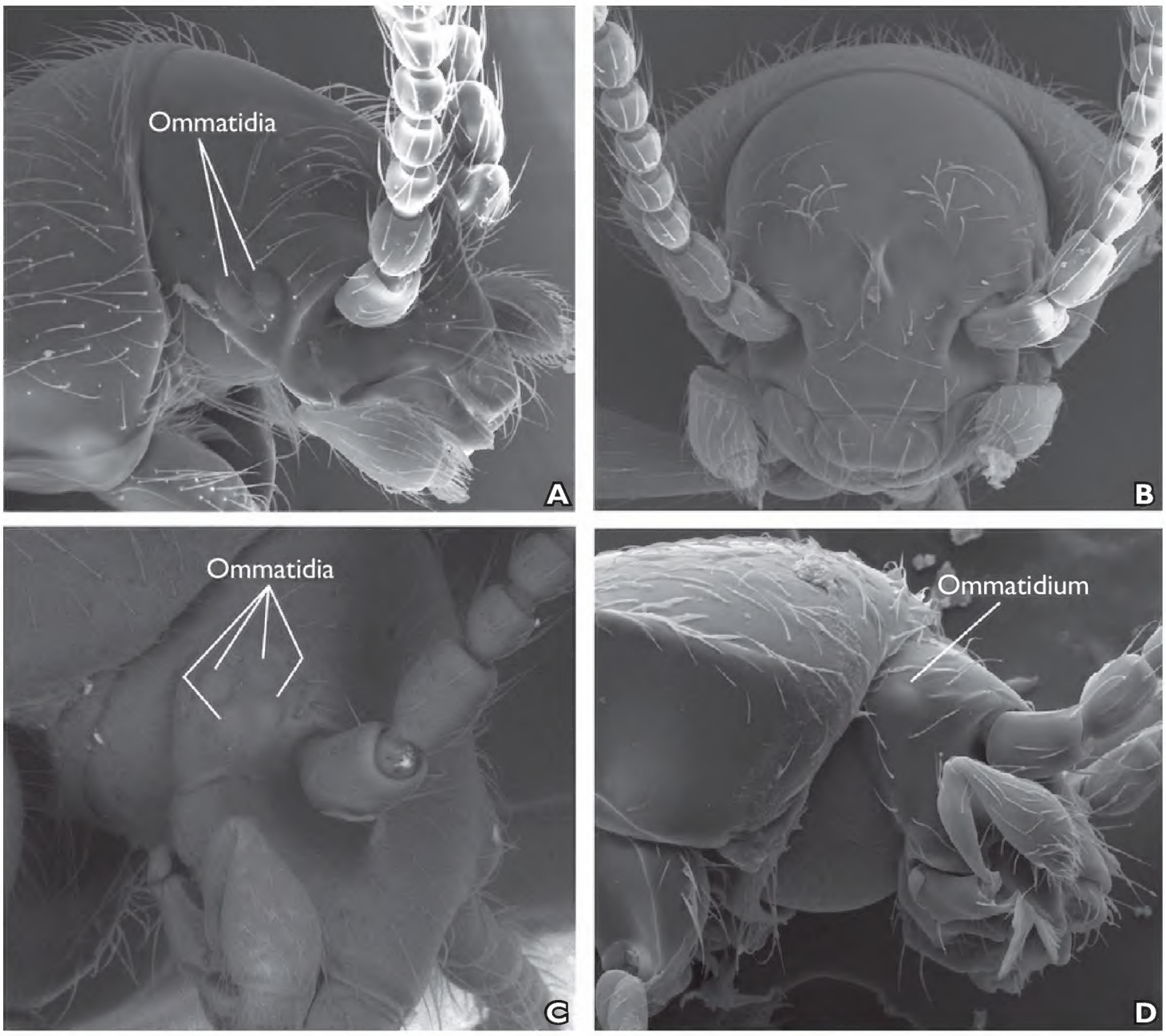

Figure 4. A–D Characters on the head, including number of ommatidia and male frons **A–B** *Cephennium celsifrons* Hopp & Caterino **C** *Cephennium mariposae* Hopp & Caterino **D** *Cephennium aridum* Hopp & Caterino.

species. *Cephennium celsifrons* and *C. mariposae* are otherwise very similar but can be distinguished by the number of ommatidia present (2 vs. 4, respectively, Figs. 4A, C). *Cephennium aridum* has a single ommatidium on each side of the head (Fig. 4D), and no other species exhibit any traces of eyes.

Description. Male. Length: 0.817–0.893 mm; pronotal width: 0.323–0.380 mm; elytral width: 0.380–0.418 mm. Body broad, ovate, slightly convex, rufo-testaceous to amber yellow, evenly densely pubescent, pubescence golden, slender, long, moderately decumbent (Fig. 1B). Head small, deflexed, sparsely pubescent, not narrowing anteriorly from antennal insertions; frons pinched medially forming a medial ridge (Fig. 4B); two ommatidia present on each side of the head (Fig. 4A). Antenna setose, antennomere I and II longer than broad, antennomeres III-VI quadrate and smaller than antennomeres II and VII, antennomere VIII smaller than antennomeres VII and IX, antennomeres IX-XI gradually clavate forming loose club. Pronotum densely pubescent, broadest between middle and anterior third, disc very convex medially and

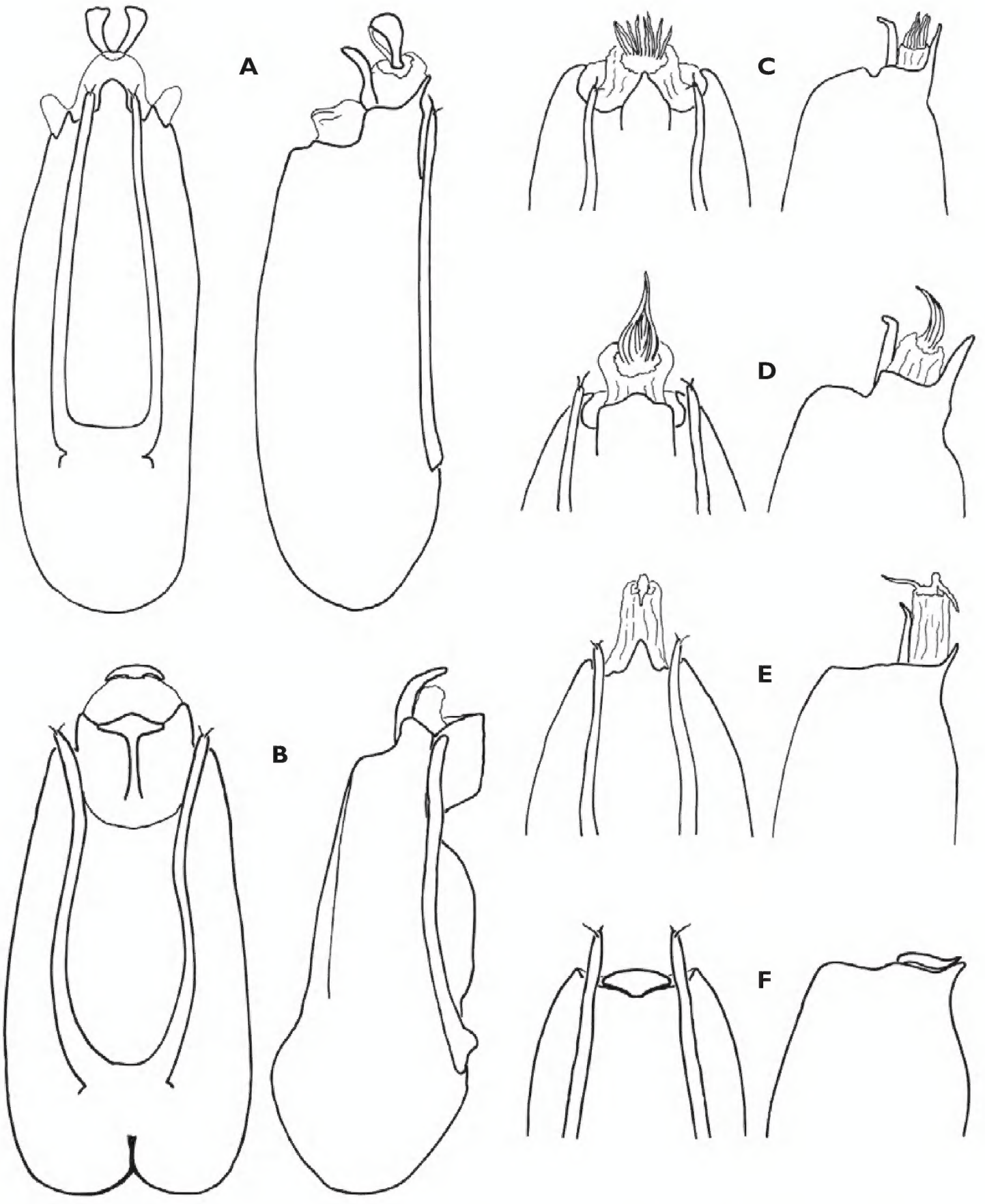

Figure 5. A–F Dorsal and lateral view of the aedeagus **A** *Cephennium anophthalmicum* Brendel **B** *Cephennium celsifrons* Hopp & Caterino **C** *Cephennium grandarboreum* Hopp & Caterino **D** *Cephennium canestroi* Hopp & Caterino **E** *Cephennium urbanum* Hopp & Caterino **F** *Cephennium aridum* Hopp & Caterino.

weakly flattened near each posterior angle; anterior margin not visible from above; anterior and posterior margin lacking marginal bead; marginal bead complete laterally, gradually widening towards base; lateral edge broadly rounded to posterior third,

then evenly curved to base (Fig. 1B). Hypomeron smooth, sparsely setose towards upper quarter and along outside (lateral) edge, hypomeral bead anterolaterad procoxae sinuate. Prosternum without nodules anterolaterad procoxal cavities (Fig. 2B). Elytra impunctate, pubescent as pronotum, covering all abdominal segments, weakly truncate at apex; elytral suture flat; elytral striae absent; basomedial fovea present on each elytron, fovea small, with dense inwardly directed setae (Figs. 1B, 3B). Humeral angles of elytron raised, dorsally flattened (plateau-like), laterally rounded; weakly curved posterad around anterolateral angle (Fig. 3B). Scutellum roundly triangular, without setae (Fig 3B). Mesosternal keel setose with indentation around each seta; smooth in the posterior quarter portion, apex straight (Fig. 2B). Metathoracic wings vestigial. Femora strongly clavate in distal half, tibiae expanded and becoming more densely setose towards distal half. Six visible abdominal sternites (fusion between ventrites V and VI incomplete). Aedeagus with median lobe rather lightly sclerotized, bulbous and deeply emarginate at base; apex with keel-like median dorsal process and dorsally curved, apically convex digiform process extending over part of apical collar (Fig. 5B).

Female. Identical to male except frons flat.

Biology. This species has been collected from berlesed litters of oak, rotten wood, mixed oak/conifer, and mixed hardwood. This species apparently favors moist habitats.

Distribution. This species has been collected in the mid-elevations of the central Sierra Nevada, from localities in Amador and Calaveras Counties (Fig. 6).

***Cephennium mariposae* Hopp & Caterino, sp. n.**
urn:lsid:zoobank.org:act:2E36C8F3-E54C-4CD3-AAF4-A5D366014F5E
Figs 1C, 2C, 3C, 4C, 6

Type Material. Holotype (sex not determined): "CALIF: Mariposa Co.; Mariposa [~37.4766°N, 119.9584°W] XI-15-1984; Berlese rotten log; A. J. Gilbert" (CSCA).

Etymology. This species is named for the county and town from which it was collected, Mariposa.

Diagnosis. This species can be distinguished from its California congeners by the character combination of the presence of four ommatidia on each side of the head (Fig. 4C), the mesosternal process truncate at the apex (Fig. 2C), and the humeral angle of the elytron weakly raised and dorsally flattened (Fig. 3C). *Cephennium mariposae* is most similar to *C. celsifrons* but can be distinguished from it by the latter having only two ommatidia on each side of the head (Fig. 2A) and a more elongate and slender body form (Fig. 1B). This species can be easily separated from *C. urbanum*, *C. anopthalmicum*, *C. canestroi*, *C. grandarboreum* and *C. gilberti* by the absence of ommatidia and the apex of the mesosternal keel being divergent in these species. It can be further distinguished from *C. anophthalmicum*, *C. urbanum* and *C. aridum* by the humeral angle of the elytron projecting laterally to a point in these three species (Fig. 3A, G-H).

Description. Length: 0.836 mm; pronotal width: 0.380 mm; elytral width: 0.437 mm. Body broad, ovate, slightly convex, testaceous, evenly densely pubescent, pubescence golden, slender, moderate in length (Fig. 1C). Head small, deflexed, sparsely pubescent, not narrowing anteriorly from antennal insertions; frons flat; four ommatidia present on each side of head. Antenna setose, antennomere I and II longer than broad, antennomeres III-VI quadrate and smaller than antennomeres II and VII, antennomere VIII smaller than antennomeres VII and IX, antennomeres IX-XI gradually clavate forming a loose club. Pronotum densely pubescent, broadest between middle and anterior third, disc convex medially and weakly flattened near each posterior angle; anterior margin not visible from above; anterior and posterior margin lacking marginal bead; marginal bead complete laterally, gradually widening towards base; lateral edge broadly rounded to posterior third, then evenly to base (Fig. 1C). Hypomeron smooth, sparsely setose towards upper quarter and along outside (lateral) edge; hypomeral bead anterolaterad procoxae sinuate. Prosternum without nodules anterolaterad procoxal cavities (Fig. 2C). Elytra impunctate, as pubescent as pronotum, covering all abdominal segments, weakly truncate at apex; elytral suture flat; elytral striae absent; basomedial fovea present on each elytron, fovea small, with moderately dense inwardly directed setae (Figs. 1C, 3C). Humeral angles of elytron raised, dorsally flattened (plateau-like), apically rounded, slender, moderately curving posterad around anterolateral angles (Fig. 3C). Scutellum roundly triangular, without setae (Fig. 3C). Mesosternal keel setose with indentation around each seta, apex not divergent (Fig. 2B). Metathoracic wings vestigial. Femora strongly clavate in distal half, tibiae expanded and becoming more densely setose towards distal half. Six visible abdominal sternites (fusion between ventrites V and VI). Aedeagus not studied.

Female. Identical to male.

Biology. The lone specimen of this species was collected from a rotten log.

Distribution. This species is only known from Mariposa in Mariposa County, CA (Fig. 6).

***Cephennium grandarboreum* Hopp & Caterino, sp. n.**

urn:lsid:zoobank.org:act:8CD00FEF-266D-42A1-8C2F-0031C5EAAF06

Figs 1D, 2D, 3D, 5C, 6

Type Material. Holotype. Male. "CA: Monterey Co.; 36.2403°N, 121.7781°W; LPNF: Sycamore Cyn.; II.14.2006; Caterino&Chatzimanolis; maple/redwood litter"/ "CA BEETLE PROJ; CBP0041534" (SBMN).

Paratypes (7): 3 specimens with same data as holotype (1 SBMN, CBP0041525 [disarticulated]; 1 FMNH, CBP0041544; 1 CASC, CBP0041516); "CA: Monterey Co.; 36.0772°N, 121.5923°W; UC Big Creek Reserve; Redwood Camp, iii.28.2004. M. Caterino, redwood litter" (1 CSCA, CBP0018437; 1 LACM, CBP0018450; 1 SBMN [in freezer for DNA]); "CA: Monterey Co.; 36.0812°N, 121.5974°W; UC Big

Creek Reserve; BigCk/BrunetteCk.confl.; ii.7.2003, M. Caterino; redwood litter" (1 SBMN, CBP0006070 [gold coated for SEM]).

Etymology. This species name is the combination of the Latin words *grandis* and *arboreus*, meaning very large tree, as this species is associated with coast redwoods (*Sequoia sempervirens*).

Diagnosis. This species is most similar to *Cephennium gilberti* but can be distinguished from it by its body size and shape. *Cephennium grandarboreum* is represented by the largest specimens (0.988–1.121 mm long) of this genus currently known to occur in California, and is very robust. *C. gilberti* is known from the smallest specimen (0.646 mm long) of this genus known to occur in California and is much more slender and elongate. These two species can also be separated by the mesosternal keel, which is strongly divergent in *C. grandarboreum*, which has the apex ~2.4× as wide as the widest anterior point (Fig. 2D). The mesosternal keel of *C. gilberti* is weakly divergent and ~2× as wide as the widest anterior point (Fig. 2F). *Cephennium grandarboreum* can be separated from all other species by having two scutellar setae (Fig.3D) instead of four (Fig. 3E) or zero (Figs 3A-C, G-H). Apart from the scutellar setae, *C. grandarboreum* and *C. canestroi* are quite similar, with rounded elytral humeral angles, but the elytral foveae are large and densely setose in *C. grandarboreum* (Figs. 1D, 2D), whereas they are smaller and moderately setose in *C. canestroi* (Fig. 1E, 2E). The humeral angle of the elytron is also more slender and posterorly curved in *C. grandarboreum* (Fig. 3D) than in *C. canestroi* (Fig. 3E), and has a more strongly divergent mesosternal keel (Fig. 2D) than *C. canestroi* (Fig. 2E).

Description. Male. Length: 0.988–1.121 mm; pronotal width: 0.418–0.437 mm; elytral width: 0.456–0.475 mm. Body broad, ovate, slightly convex, rufo-testaceous to amber yellow, evenly densely pubescent, pubescence golden, slender, long (Fig. 1D). Head small, deflexed moderately pubescent, weakly narrowing anteriorly from antennal insertions; eyes absent. Antenna setose, antennomere I and II longer than broad, antennomeres III-VI quadrate and smaller than antennomeres II and VII, antennomere VIII smaller than antennomeres VII and IX, antennomeres IX-XI gradually clavate forming a loose club. Pronotum densely pubescent, broadest between middle and anterior third, disc very convex medially and weakly flattened near each posterior angle; anterior margin not visible from above; anterior and posterior margin lacking marginal bead; marginal bead complete laterally, gradually widening towards base; lateral edge broadly rounded to posterior third, then weakly sinuate at base (Fig. 1D). Hypomeron smooth, sparsely setose towards upper quarter and along outside (lateral) edge, hypomeral bead anterolaterad procoxae with small knob at apex. Prosternum with small, weakly produced egg-shaped nodules anterolaterad procoxal cavities (Fig. 2D). Elytra impunctate, as pubescent as pronotum, covering all abdominal segments, weakly truncate at apex; elytral suture flat; elytral striae absent; basomedial fovea present on each elytron, fovea large, deep, with dense inwardly directed setae (Fig. 1D, 3D). Humeral angle of elytron raised laterad scutellum to humeral angle, humeral plateau slender, dorsally flattened, apically rounded; apex reaching posterad past midline of elytral fovea (Fig. 3D). Scutellum roundly triangular, with two setae (Fig. 3D). Mesosternal keel setose, texture ap-

pearing as fish scales anteriorly, abruptly smooth and impunctate near mesometasternal suture, apex strongly bifid and divergent, posterior projections long (Fig. 2D). Metathoracic wings vestigial. Femora strongly clavate in distal half, tibiae expanded and becoming more densely setose towards distal half. Five visible abdominal sternites (sometimes appearing as six due to weak fusion between ventrites V and VI). Aedeagus with median lobe bulbous, heavily sclerotized, median dorsal projection coming to point at apex (triangular), reaching past apical collar; apical collar with dense setae surrounding opening; dorsal parameres slender, longer than median lobe but not extending past apical collar, with lateral subapical setae on each side; apical digiform process extending past apical collar, bent ventrad near apex (Fig. 5C).

Female. Identical to male.

Biology. Specimens were extracted from redwood litter and a combination of maple and redwood litter with the use of Berlese funnels.

Distribution. This species is known from a few localities near Big Sur, Monterey County, CA (Fig. 6).

Cephennium canestroi Hopp & Caterino, sp. n.

urn:lsid:zoobank.org:act:55F6B353-76A2-4826-8D8E-6FD28BE5671C
Figs 1E, 2E, 3E, 5D, 6

Type Material. Holotype. Male. "CA: San Luis Obispo Co.; 35.5249°N, 121.0719°W; UC Rancho Marino Res.; II.26.2009, *Salix* litter; M.S. Caterino"/ "CA BEETLE PROJ; CBP0087147" (SBMN).

Paratypes (5): "CA: San Luis Obispo Co.; 35.5361°N, 121.0723°W; UC Rancho Marino Res.; III.10.2009, M.S. Caterino; *Heteromeles* litter" (2 SBMN, CBP0087853 [gold coated for SEM], CBP0087825 [disarticulated]; 1 CASC, CBP0087841; 1 CSCA, CBP0087830; 1 FMNH, CBP0087815 [male genitalia dissected out and gold coated for SEM]).

Etymology. We are pleased to name this species for Don Canestro, director of the Rancho Marino Reserve, in appreciation of his generous assistance with our fieldwork.

Diagnosis. This species can be separated from its California congeners by the character combination of the absence of eyes, humeral plateau of the elytra raised, dorsally flattened and apically rounded, and scutellum with four setae (Fig. 3E). *Cephennium canestroi* most closely resembles *C. grandarboreum* and *C. gilberti*, all having a generally rounded humeral angle (Figs. 3D-F), but *C. canestroi* can be distinguished from them by having four scutellar setae (Fig. 3E) instead of two (Fig. 3D, F). *Cephennium canestroi* can be separated from *C. anophthalmicum* and *C. urbanum* by the shape of the elytral humeral angle, which projects laterally to a point in the latter two species (Fig. 3G-H).

Description Male. Length: 0.836–0.922 mm; pronotal width: 0.314–0.323 mm; elytral width: 0.361–0.380 mm. Body elongate, slender, weakly convex; amber-yellow, transparent under light, evenly and moderately pubescent, pubescence golden, slender, moderately long, weakly recumbent (Fig. 1E). Dorsal surface of head impunctate, weakly

pubescent, weakly narrowing anteriorly from antennal insertions. Eyes absent. Antenna setose, antennomeres I and II longer than broad, antennomeres III-VI quadrate and smaller than antennomeres II and VII, antennomere VIII smaller than antennomeres VII and IX, antennomeres IX-XI gradually clavate forming a loose club. Pronotum pubescent, broadest between middle and anterior third, very convex in disc and weakly flattened near each posterior angle; anterior margin not visible from above; anterior and posterior margin lacking marginal bead; marginal bead complete laterally, gradually widening towards base; lateral edge broadly rounded to posterior third, then sinuate to base (Fig. 1E). Hypomeron impunctate, sparsely setose towards anterior quarter and along outside (lateral) edge (Fig. 2E). Prosternum with prominent egg-shaped nodules anterolaterad procoxal cavities (Fig. 2E). Elytra smooth, as pubescent as pronotum, covering all abdominal segments; elytral suture flat; elytral striae absent, basomedial fovea present on each elytron, fovea small, moderately pubescent (Figs. 1E, 2E). Humeral angle of elytron raised from laterad scutellum along anterior margin to humeral angle, humeral plateau broad, dorsally flattened, apically rounded, not reaching past midline of elytral fovea (Fig. 3E). Scutellum nearly semicircular, with four setae present (two on each side of the midline) (Fig. 3E). Mesosternal keel setose, texture appearing like fish scales in its entirety until abruptly smooth in the posterior quarter, weakly bifid at mesometasternal suture, divergent projections short (Fig. 2E). Metathoracic wings vestigial. Femora strongly clavate in distal half; tibiae expanded and becoming more densely setose towards distal half. Five visible abdominal sternites, with partial fusion between the apical two (ventrites V and VI). Aedeagus with median lobe bulbous, strongly sclerotized, median dorsal projection parallel-sided at base, convergent and bisinuate at apex, not reaching past apical collar; apical collar with dense setae meeting medially and forming wick-like setal extension, curving ventrad; dorsal parameres slender, extending beyond apex of median lobe but not past apical collar, each with two subapical setae; apical digiform process present, bent ventrad near apex (Fig. 5D).

Female. Identical to male.

Biology. This species has been collected from *Heteromeles* (Toyon) and *Salix* (Willow) litter. The collecting sites occur near a native stand of Monterey Pine (*Pinus radiata*), and is along the coast near the town of Cambria. Collecting sites were in a rocky drainage, with sparse shrubby willow cover, facing and only a few hundred meters from the ocean, and on a shaded northeast facing slope under a very large toyon tree, with a dense understory of *Rubus* and *Toxicodendron*.

Distribution. This species has been only collected from San Luis Obispo County, CA, in the University of California Rancho Marino Reserve (Fig. 6).

***Cephennium gilberti* Hopp & Caterino, sp. n.**
urn:lsid:zoobank.org:act:307DD4D1-D511-447D-AFF4-2258EE6DFC10
Figs 1F, 2F, 3F, 6

Type Material. Holotype (unknown sex): "CALIF: Kern Co.; 5 mi. E Glenville [sic] [~ 35.7486°N, 118.5805°W]; Alta Sierra Camp; III-12-1979; A.J. Gilbert"/ "Berlesed;

Oak; Litter" (CSCA). We did not risk dissecting the type to determine sex due to its uniqueness and minute size.

Etymology. We name this species in honor of Dr. Art Gilbert, collector of the unique specimens of two of the species described herein, including this one.

Diagnosis. This species can be distinguished from its California congeners by the character combination of the eyes absent, humeral angle of the elytron raised, dorsally flattened and apically rounded (Fig. 3F), scutellum with two setae (Fig. 3F), and the mesosternal keel weakly divergent at the apex (Fig. 2F). This species most closely resembles *C. grandarboreum*, but can be distinguished from it by its smaller size (0.646 mm long), more elongate and slender body (Fig. 1F), the posterior angles of the pronotum being sharper in *C. gilberti* (Fig. 1F), and the mesosternal keel more weakly divergent at the apex with the apex approximately only 2× as wide as the widest point anterior to the apex (Fig. 2F), as opposed to the apex strongly divergent and nearly 2.4× as wide as the widest point anterior to the apex as in *C. grandarboreum* (Fig. 2D). *C. gilberti* can be separated from *C. anophthalmicum*, *C. urbanum* and *C. aridum* by the humeral angle of the elytron, which projects laterally to a point in these species (Fig. 3A, G-H). Finally, it can be distinguished from *C. celsifrons*, *C. mariposae* and *C. aridum* by the presence of ommatidia in these species (Fig. 4A, C-D).

Description (sex unknown). Length: 0.646 mm; pronotal width: 0.228 mm; elytral width: 0.266 mm. Body elongate, slender, weakly convex, amber yellow, evenly moderately pubescent, pubescence golden, slender, moderate in length (Fig. 1F). Head small, deflexed, sparsely pubescent; frons flat; eyes absent. Antenna setose, antennomeres I and II longer than broad, antennomeres III-VI quadrate and smaller than antennomeres II and VII, antennomere VIII smaller than antennomeres VII and IX, antennomeres IX-XI gradually clavate forming a loose club. Pronotum moderately pubescent, broadest between middle and anterior third, disc very convex medially and weakly flattened near each posterior angle; anterior margin not visible from above; anterior and posterior margin lacking marginal bead; marginal bead complete laterally, gradually widening towards base; lateral edge broadly rounded to posterior third, then slightly sinuate to base (Fig. 1F). Hypomeron smooth, sparsely setose towards upper quarter and along outside (lateral) edge, hypomeral bead anterolaterad procoxae sinuate. Prosternum with prominent, bluntly triangular nodules anterolaterad procoxal cavities (Fig. 2F). Elytra impunctate, as pubescent as pronotum, covering all abdominal segments, weakly truncate at apex; elytral suture flat; elytral striae absent; basomedial fovea present on each elytron, fovea large, with moderately dense inwardly directed setae (Figs. 1F, 3F). Humeral angles of elytron raised, dorsal plateau apically rounded, slender, barely reaching beyond anterior portion of the elytral fovae (Fig. 3F). Scutellum roundly triangular, with two short setae, one on each side of the midline (Fig. 3F). Mesosternal keel setose with scale-like microsculpture over most of length, abruptly smooth near meso-metasternal junction, apex weakly divergent, angulate (Fig. 2F). Metathoracic wings vestigial. Femora strongly clavate in distal half, tibiae expanded and becoming more densely setose towards distal half. Six visible abdominal sternites (fusion between ventrites V and VI not evident).

Biology. This species has been collected only from berlesed oak litter.

Distribution. This species is known from a single locality five miles east of Glennville, at about 1800m in the southern Sierra Nevada of Kern County, CA (Fig. 6).

***Cephennium urbanum* Hopp & Caterino, sp. n.**
urn:lsid:zoobank.org:act:5640D121-C792-4274-B02B-01EA234F177E
Figs 1G, 2G, 3G, 5E, 6

Type Material. Holotype. Male. "CA: Los Angeles Co.; 34.0824°N, 118.5660°W; Topanga SP, Santa Ynez; Cyn, III.30.2009; K.J. Hopp; *Quercus*/*Platanus* litter"/ "CA BEETLE PROJ; CBP0088983" (SBMN).

Paratypes (20): 9 specimens with same data as holotype (8 SBMN, CBP0088984 [male genitalia dissected], CBP0088982, CBP0088981, CBP0088989, CBP0088986, CBP0088990, CBP0088988 [male genitalia gold coated for SEM], CBP0088987 [disarticulated]; 1 LACM, CBP0088985); "CA: Los Angeles Co.; 34.0768°N, 118.8163°W; Santa Monica Mts:; Zuma Cyn, IV.14.2009; M.S. Caterino & K.J. Hopp; *Heteromeles* litter" (2 SBMN, CBP0089582, CBP0089583 [gold coated for SEM]); "CA: Los Angeles Co.; 34.0760°N, 118.8170°W; Santa Monica Mts:; Zuma Cyn, IV.14.2009; M.S. Caterino & K.J. Hopp; *Heteromeles*/*Ceanothus* litter" (1 SBMN, CBP0089561); "CA: Los Angeles Co.; 34.1258°N, 118.6567°W; SAMO, Calabasas Cold; Creek Trail, IV.22.2009; K.J. Hopp & M. Polihronakis; *Quercus*/*Neotoma* litter" (2 SBMN, CBP0090114, CBP0090115); "CA: Los Angeles Co.; 34.0561°N, 118.8800°W; Charmlee Park, IV.14.2009; M.S. Caterino & K.J. Hopp; *Quercus* litter" (1 SBMN, CBP0089831); "CA: Los Angeles Co.; 34.0723°N, 118.6846°W; Santa Monica Mts NRA; Piuma Rd, III.30.2009; K.J. Hopp, *Quercus*/*Ceanothus*/*Heteromeles* litter" (1 SBMN, CBP0089190; 1 CSCA, CBP0089191); "CA: Los Angeles Co.; 34.0948°N, 118.7242°W; Santa Monica Mts:; Malibu Ck SP; *Quercus*/*Rhus* litter, II.8.2009; M.S. Caterino & K.J. Hopp" (1 FMNH, CBP0086147); "CA: Los Angeles Co.; 34.0969°N, 118.7276°W; Santa Monica Mts:; Malibu Ck SP; *Quercus* litter, II.8.2009; M.S. Caterino & K.J. Hopp" (1 CASC, CBP0086092); "Pasadena; Cal."/ "H. C. FALL; COLLECTION" (1 MCZC).

Etymology. The species name *urbanum* signifies the proximity of the Santa Monica Mountains to the urban development of greater Los Angeles. These mountains represent an extremely important island of native biodiversity surrounded by development.

Diagnosis. This species can be distinguished from its California congeners by the character combination of the absence of eyes, humeral angles of elytral project laterally to a sharp point (Fig. 3G), presence of a basal elytral sutural ridge (Fig. 1G), and the apex of the mesosternal keel crescent-shaped (Fig. 2G). This species most closely resembles *C. anophthalmicum* but they can be separated by the basal sutural ridge, absent from *C. anopthalmicum*, and the apex of the mesosternal keel, which is divergent and crescent-shaped in *C. urbanum* (Fig. 2G) and very weakly divergent and angulate in *C. anophthalmicum* (Fig. 2A). It can be easily distinguished from *C. celsifrons*, *C. mariposae* and *C. aridum* by the presence of eyes in these species (Fig. 4A, C-D). Finally, it can be distinguished from *C. grandarboreum*, *C. canestroi* and *C. gilberti* by the humeral angle of the elytron, which is raised and rounded in these three species (Fig. 3D-F).

Description. Male. Length: 0.760–0.874 mm; pronotal width: 0.304–0.342 mm; elytral width: 0.352–0.399 mm. Body elongate, slender, weakly convex; amber-yellow,

translucent; evenly and moderately pubescent; pubescence golden, slender, moderately long, weakly decumbent (Fig. 1G). Dorsal surface of head smooth, weakly pubescent, narrowing anteriorly from antennal insertions. Eyes absent. Antennae setose, antennomeres I and II longer than broad, antennomeres III-VI quadrate and smaller than antennomeres II and VII, antennomere VIII smaller than antennomeres VII and IX, antennomeres IX-XI gradually clavate forming a loose club. Pronotum moderately pubescent, broadest between middle and anterior third, very convex in disc and moderately flattened near each posterior angle; anterior margin not visible from above; anterior and posterior margin lacking marginal bead; lateral marginal bead complete, gradually widening towards base; lateral edge broadly rounded to posterior third, then weakly sinuate to base (Fig. 1G). Hypomeron smooth, sparsely setose towards anterior quarter and along outside (lateral) edge. Prosternum with large, protruding, obliquely oriented, ovate nodules anterolaterad procoxal cavities (Fig. 2G). Elytra smooth, as pubescent as pronotum, covering all abdominal segments; elytral sutural margin raised from base of scutellum to < 1/3 the length of elytra; basomedial fovea present on each elytron; fovea small, moderately pubescent (Figs. 1G, 3G). Humeral angle of elytron projecting laterally to a sharp point (Fig. 3G). Scutellum weakly triangular, lacking setae (Fig. 3G). Mesosternal keel setose, anterior quarter with scale-like microsculpture, between coxae with large, round setose punctures, lacking scale-like microsculpture, and with posterior quarter impunctate, apex weakly bifid (divergent), divergent projections short, posterior margin crescent-shaped (Fig. 2G). Metathoracic wings vestigial. Femora strongly clavate in distal half, tibiae expanded and becoming more densely setose towards distal half. Five visible abdominal sternites, ventrites VI and VII partially fused. Aedeagus with median lobe bulbous, heavily sclerotized, median dorsal process triangular lacking parallel-sided base, not reaching past apical collar; apical collar membranous, long, with thin dorsally and ventrally articulated projections; dorsal parameres slender, extending just beyond end of median lobe but not past apical collar, each with two subapical seta; apical digiform process bent weakly ventrad near apex (Fig. 5E).

Female. Identical to male.

Biology. This species has been sifted and extracted by Berlese funnels from *Quercus* (oak) and *Heteromeles* (Toyon) litter as well as mixed litters of *Quercus* and *Rhus* (sumac), *Quercus* and *Salix* (willow), *Quercus* and *Platanus* (sycamore), *Quercus*, *Ceanothus* (California lilac), and *Heteromeles,* and from a *Neotoma* (woodrat) nest pile under *Quercus*.

Distribution. This species has mainly been collected in the Santa Monica Mountains in Los Angeles County, CA, with a single record from 'Pasadena' in the western foothills of the San Gabriel Mountains (Fig. 6).

Cephennium aridum Hopp & Caterino, sp. n.

urn:lsid:zoobank.org:act:859E5725-2579-406B-8E7A-7AB07AE6739B
Figs 1H, 2H, 3H, 4D, 5F, 6

Type Material. Holotype. Male. "CA: San Bernardino Co.; 34.1405°N, 116.4541°W; UC Burns Reserve; Railroad Cyn, IV.1.2008; sifted from grass & flood debris; M. Ca-

debris; M. Caterino & R. Leschen"/ "CA BEETLE PROJ; CBP0072926" (SBMN [gold coated for SEM]).

Paratypes (9): "CALIF: Riverside Co; 4mi SE Valle Vista; II-1978 K.Cooper; Oak litter 78-57"/ "CEPHENNIUM; spp.; S. O'KEEFE DET '90" (1 SBMN); "CALIF: Riverside Co; Palm Canyon Aqua [sic]; Caliente Reservation; IV-27-1978 78-67; K.W.Cooper"/ "berlese litter; at base of *Washingtonia filifera*" (1 CSCA); "CALIF: Riverside Co.; Whitewater cyn. Palm Oasis; V-4-1987 to XI-27-1988; Rolf L. Aalbu coll."/ "Ethylene-glycol pitfall; trap at base of *Washingtonia filifera*" (2 CSCA); "CALIF: Riverside Co.; 2 mi. E Gilman Hot; Springs, Lamb Canyon; V-18-1978/XI-13-1979; Fred G. Andrews; Antifreeze pit trap" (5 CSCA).

Etymology. This species name refers to its occurrence in the arid regions of the western Mojave/Colorado desert transition zone.

Diagnosis. This species can be immediately distinguished from all of its California congeners by the presence of a single ommatidium on each side of the head (Fig. 4D). Besides this somewhat cryptic character, *C. aridum* shares a sharply angulate humeral process only with *C. urbanum*. The mesosternal keel of *C. aridum*, however, has scale-like microsculpture between the mesocoxae (Fig. 2H), whereas that of *C. urbanum* has only setose punctures between the coxae, its scale-like microsculpture being restricted to the extreme anterior end (Fig. 2G). The mesosternal process of *C. urbanum* is also distinctly crescent-shaped (Fig. 2G), where that of *C. aridum* is angulate (Fig. 2H).

Description. Male. Length: 0.817–0.912 mm; pronotal width: 0.304–0.342 mm; elytral width: 0.352–0.418 mm. Body elongate, slender, weakly convex; amber-yellow, translucent; evenly and moderately pubescent; pubescence golden, slender, moderately long, weakly decumbent (Fig. 1H). Dorsal surface of head smooth, sparsely pubescent, narrowing anteriorly from antennal insertions. Single ommatidium present on each side of head (Fig. 4D). Antenna setose, antennomeres I and II longer than broad, antennomeres III-VI quadrate and smaller than antennomeres II and VII, antennomere VIII smaller than antennomeres VII and IX, antennomeres IX-XI gradually clavate forming a loose club. Pronotum moderately pubescent, broadest between middle and anterior third, very convex in disc part and moderately flattened near each posterior angle; anterior margin not visible from above; anterior and posterior margin lacking marginal bead; marginal bead complete laterally, gradually widening towards base; lateral edge broadly rounded to posterior third, then weakly sinuate to base (Fig. 1H). Hypomeron smooth, sparsely setose towards anterior quarter and along outside (lateral) edge. Prosternum with small, weakly protruding, oblique narrowly ovate nodules anterolaterad procoxal cavities (Fig. 2H). Elytra smooth, lacking striae, as pubescent as pronotum, covering all abdominal segments; elytral suture absent; basomedial fovea present on each elytron; fovea small, moderately pubescent (Figs. 1H, 3H). Humeral angle of elytron projecting laterally to sharp point (Fig. 3H). Scutellum weakly triangular, lacking setae (Fig. 3H). Mesosternal keel sparsely setose, with scale-like microsculpture over most of its length, abruptly smooth in posterior extreme, apex moderately bifid, divergent projections short, diverging at ~90° an-

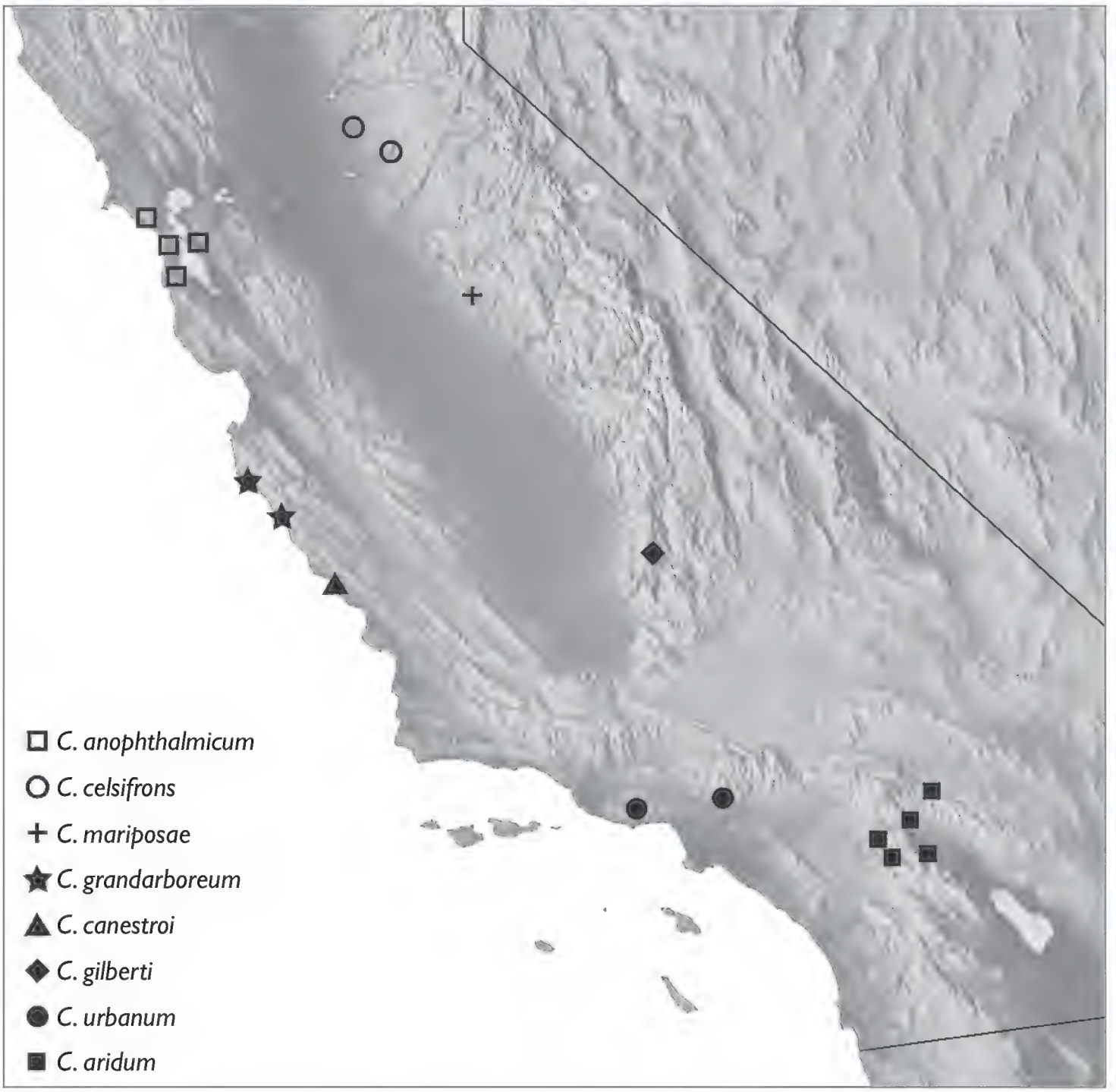

Figure 6. Distribution map for all California species of *Cephennium*.

gle (Fig. 2H). Metathoracic wings vestigial. Femora strongly clavate in distal half; tibiae expanded and becoming more densely setose towards distal half. Five visible abdominal sternites, ventrites V and VI largely fused. Aedeagus with median lobe bulbous, heavily sclerotized, truncate at apex, with very short median dorsal process, weakly emarginate for reception of apex of apical digiform process; apical collar not apparent; dorsal parameres slender, extending well beyond end of median lobe, each with two subapical setae (Fig. 1H).

Female. Unknown.

Biology. The type of this species was sifted from grass and flood debris in a small, spring-fed, but frequently dry drainage. Other specimens were sifted from litter of the native California Fan Palm (*Washingtonia filifera*), which also occur in scattered spring-fed drainages in the Colorado (and broader Sonoran) desert.

Distribution. This species is known from several localities in the far northeastern Colorado desert, in San Bernardino and Riverside Counties, CA (Fig. 6).

Key to the species of California *Cephennium* Müller and Kunze

1 Eyes present, reduced (Fig. 4A, C-D) **2**
– Eyes absent..... **4**
2(1) Mesosternal process straight, not divergent at apex (Fig. 2B); frons of males with medial ridge (Fig. 4B) ..... ***C. celsifrons* Hopp & Caterino, sp. n.**
– Mesosternal process divergent at apex (Fig. 2A, D-H); frons of males flat, without medial ridge..... **3**
3(2') Single ommatidium present on each side of head (Fig. 4D); humeral angle of elytron apically pointed (Fig. 3H); body elongate, slender.....
.....***C. aridum* Hopp & Caterino, sp. n.**
– Four ommatidia present on each side of head (Fig. 4C); humeral angle of elytron apically rounded (Fig. 3C); body robust.....
..... ***C. mariposae* Hopp & Caterino, sp. n.**
4(1') Humeral angle of elytron apically pointed (Fig. 3A, G-H) **5**
– Humeral angle of elytron apically rounded (Fig. 3B-F) **6**
5(4) Basal elytral sutural ridge present (Fig. 1G); apex of mesosternal keel crescent-shaped (Fig. 2G) .....***C. urbanum* Hopp & Caterino, sp. n.**
– Basal elytral sutural ridge absent; apex of mesosternal keel triangulate (Fig. 2A) ..... ***C. anophthalmicum* Brendel**
6(2') Scutellum with two setae (Fig. 3D, F)..... 7
– Scutellum with four setae (Fig. 3E) ..... ***C. canestroi* Hopp & Caterino, sp. n.**
7(6) Body robust; moderately large, 0.988–1.121 mm in length; mesosternal keel strongly divergent at apex, apex 2.4× as wide as widest point anteriorly (Fig. 2D); scutellar setae long, extending past posterior margin of scutellum (Fig. 3D)..... ***C. grandarboreum* Hopp & Caterino, n.sp.**
– Body elongate, slender; very small, 0.646 mm in length; mesosternal keel weakly divergent at apex, apex 2× as wide as widest point anteriorly (Fig. 2F); scutellar setae short, not extending past posterior margin of scutellum (Fig. 3F)..... ***C. gilberti* Hopp & Caterino, n.sp.**

Checklist of the California species of *Cephennium* Müller and Kunze

Cephennium anophthalmicum Brendel, 1889
Alameda Co., Marin Co. and San Mateo Co.
Cephennium celsifrons Hopp & Caterino, sp. n.
Amador Co. and Calaveras Co.
Cephennium mariposae Hopp & Caterino, sp. n.
Mariposa Co.
Cephennium grandarboreum Hopp & Caterino, sp. n.
Monterey Co.
Cephennium canestroi Hopp & Caterino, sp. n.

San Luis Obispo Co.

Cephennium gilberti Hopp & Caterino, sp. n.

Kern Co.

Cephennium urbanum Hopp & Caterino, sp. n.

Los Angeles Co.

Cephennium aridum Hopp & Caterino, sp. n.

Riverside Co. and San Bernardino Co.

Discussion

The discovery of these new species constitutes a significant expansion of the known range of *Cephennium*, and Cephennini in general, in the New World. Previously represented by a single species, confined to moist coastal forests of central California, *Cephennium* appeared to have a minimal, possibly relictual, presence in North America. The discovery of several additional species, across widely separated and ecologically varied habitats instead indicates that the group has undergone considerable diversification in the region. The type localities of *C. grandarboreum and C. canestroi*, in Monterey and San Luis Obispo Counties, alone would represent only a slight extension of range down the coast, into an area otherwise known to host several southernmost records for various beetles (Caterino, unpublished data). The cool and foggy coastal environments conceivably provide similar microhabitats to those inhabited by the genus further northward. The discovery of *Cephennium* in the Santa Monica Mountains, however, represents a major disjunction, not only in distance, but into much drier environments, mostly dominated by chaparral and relatively sparse oak woodland. The presence of *C. aridum* on the fringes of the Colorado desert takes this to an extreme, occurring in areas receiving less than 10 inches of rain/year. Finding additional, localized species in the Sierra Nevada also extends the range of the genus into true montane habitats. Together these new localities indicate surprising adaptability in ecological requirements, and suggest that many other populations of these beetles will be discovered through diligent searching.

Aside from the above habitat-related observations, we know very little about the natural history of these beetles, as all were collected through Berlese extraction of sifted leaf litter. The litters represent a variety of plants and plant communities, from fan palm oases to chaparral, redwood forest, and oak woodland. In these habitats, species of *Cephennium* are expected to be armored mite predators, with suction disks on their labium, and rasp-like mandibles to slowly grind a hole in the thick dorsal surface of the mite (Schmid 1988; Newton and Franz 1998; O'Keefe 2001; Jałoszyński 2009). We have observed similar labial suction disks to those described for European species. Thus, it is probably a safe speculation that the new species are also specialist oribatid mite predators.

The biogeographic history of the California Floristic Province is complex and poorly understood. While broad scale distributional patterns have long been evident, understanding the finer scale movements of lineages through time has suffered from very fragmentary data on distribution patterns for those smaller, more sedentary taxa that would be most expected to reflect deep history. The cryptic fauna of leaf litter stands to greatly increase not only our knowledge of gross biodiversity, but also the evolutionary processes responsible for generating and maintaining it. The insect fauna of this region in general remains woefully underdocumented. Increased survey effort focusing on the more cryptic elements of the regional fauna would be repaid many times over in biogeographic understanding and in management applicability.

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